

**REMARKS**

Claims 1-14 are pending. Claims 1-3 and 7-13 have been withdrawn from consideration. Claim 14 has been added herein. Support for new claim 14 is found at page 12, line 23 to page 14, line 23 of the specification and FIGs. 6-7.

**Applicants' Response to the Claim Rejections under 35 U.S.C. § 103**

Claims 4-6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda et al. ("Umeda") USPN 6,252,296 in view of Wristers et al. ("Wristers") USPN 5,674,788/Karasawa (JP 6-151829). Applicants respectfully traverse the §103 rejection on the basis that the limitations of (1) the claimed  $\text{NSi}_3$  structure and (2) the claimed existence ratio of  $\text{NSi}_3$  to N atoms being smaller than 20% are not disclosed in the prior art. Further, the existence ratio is a critical limitation based on the disclosure in the specification and deserves full weight as such.

There is no clear teaching, disclosure or suggestion in the cited references of the formation of the  $\text{NSi}_3$  structure, set forth in claim 4 as "subject nitrogen atom" and described in the specification at page 11, line 20 to page 12, line 1 and Fig 4D. The  $\text{NSi}_3$  structure is not present in the primary reference. The Office Action relies on secondary references Wristers et al. and Karasawa for this limitation. However, neither of these references clearly discloses an  $\text{NSi}_3$  structure.

Wristers discloses the formation of Si-N bonds in the oxynitride layer 20, but also discloses that "... nitrogen forms bonds with silicon and oxygen at uniform intervals within the oxynitride structure." Col. 9, lines 4-5. Hence, there is no clear teaching of an  $\text{NSi}_3$  structure.

Karasawa discloses performing ion implementation of nitrogen atoms into silicon oxynitride film. However, no passage of Karawasa discloses the  $\text{NSi}_3$  structure.

Second, applicants respectfully request more consideration be given to the limitation that  $\text{NSi}_3$  has an existence ratio of 20% or smaller. The Examiner asserts that the limitation has no patentable weight because “the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom.” However, the critical nature of the  $\text{NSi}_3$  structure is the basis of the specification. The specification clearly states that the phrase “ $\text{NSi}_3$  structure” relates only to the Fig. 4D structure, which is claimed in claim 4. Page 11, lines 25 to page 12, line 1.

Further, Figs. 5, 6 and 7 and pages 11-14 detail that when there is no existence ratio of  $\text{NSi}_3$  structure to the total number of nitrogen atoms of 20% or smaller, a large mutual conductance is obtained. See page 13, lines 12-17 and Figs. 5 and 6. See also page 16, lines 15-17 (“If the existence ratio of the  $\text{NSi}_3$  structure...to the total number of nitrogen atoms is 20% or smaller, good electrical characteristics can be expected.”) Hence, the critical nature of the claimed  $\text{NSi}_3$  structure is clearly set forth in the specification.

As described in lines 10-22 on page 12 of the present specification, the electrical characteristics of a transistor have almost no correlation to the density of the  $\text{NSi}_3$  structure (bonds of Si are all coupled to N). The existence as defined in claim 4 is not simple density of the  $\text{NSi}_3$  structure (bonds of Si are all coupled to N) in the silicon oxynitride film, but a ratio to a total number of nitrogen atoms in the silicon oxynitride film.

Claims 4 is characterized by the existence ratio which has been introduced as a new evaluation index by the inventors as well as the limitation using a numeric value that is 20%. Applicants respectfully submit that the feature defined by this evaluation index fulfills patentability in itself.


Response under 37 C.F.R. §1.111  
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In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,  
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